CLAIMS

1. A polymerization process, comprising:
polymerizing macromonomers with a compatible macroinitiator to form a graft (co)polymer.

2. The process of claim 1, wherein the polymerization process is a radical polymerization process.

3. The process of claim 1, wherein the polymerization process is a controlled polymerization process.

4. The process of claim 3, wherein the polymerization process is a controlled radical polymerization process.

5. The process of claim 3, wherein the polymerization process is a controlled addition polymerization process.

6. The process of claim 1, wherein the macromonomer comprises silicon.

7. A polymerization process, comprising:
copolymerizing copolymerizable monomers and first (co)polymerizable macromonomers with a compatible macroinitiator.

8. The polymerization process of claim 7, wherein the first (co)polymerizable monomers and macromonomers are radically copolymerizable.

9. The polymerization process of claim 7 wherein the first (co)polymerizable macromonomer comprises silicon.

10. The polymerization process of claim 7, wherein the first (co)polymerizable macromonomer comprises a biocompatible monomer unit.

11. The polymerization process of claim 7, wherein the first (co)polymerizable macromonomer is a polyolefin.

12. The polymerization process of claim 7, wherein the copolymerizable monomers are small molecule monomers.

13. The polymerization process of claim 7, wherein the first macromonomer comprises reactive terminal functionality which form a gradient copolymer with the copolymerizable monomer.

14. The polymerization process of claim 13, further comprising:

polymerizing a second copolymerizable macromonomer comprising reactive terminal functionality different than the reactive functionality on the first copolymerizable macromonomer.

15. The polymerization process of claim 14, further comprising:

forming a graft copolymer with a homogeneous distribution of grafts.

16. The polymerization process of claim 14, wherein a ratio of the reactivity of the copolymerizable macromonomers to the reactivity of the copolymerizable monomer is within the range of 0.5 to 1.5.

17. The polymerization process of claim 14, wherein the first and second copolymerizable macromonomers comprise different monomer units.

18. The process of claim 17, further comprising:

forming a gradient copolymer.

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19. The process of claim 15, wherein the grafts comprise at least one lactic acid unit and the molecular weight distribution of the backbone is less than 2.

20. The process of claim 17, wherein the macroinitiator comprises a gradient or a block copolymer segment.

21. A polymerization process, comprising:

polymerizing free radically polymerizable monomers and free radically polymerizable macromonomers with a macroinitiator, wherein in the macroinitiator comprises a graft copolymer.

22. The process of claim 21, further comprising:

forming a graft copolymer comprising cross linking functional groups; and

crosslinking the copolymer to stabilize the morphology of the bulk graft copolymer.

23. A graft copolymer, comprising:

a backbone comprising free radically polymerizable monomer units; and graft (co)polymer segments distributed along the backbone.

24. The graft copolymer of claim 23, wherein the graft (co)polymer segments are distributed uniformly along the backbone.

25. The graft copolymer of claim 23, wherein the graft (co)polymer segments are distributed along the backbone with a higher concentration of the graft (co)polymer segments at one end of the backbone.

26. The graft copolymer of claim 23, wherein the graft (co)polymer segments are distributed along the backbone with a higher concentration of the graft (co)polymer segments at both ends of the backbone.

27. The graft copolymer of claim 23, wherein the graft (co)polymer segments are block copolymers and each block comprises different monomer units.

28. The graft copolymer of claim 27, wherein the copolymer forms a single homogeneous phase.

29. The graft copolymer of claim 27, wherein the copolymer forms a biphasic copolymer.

30. The graft copolymer of claim 27, wherein the copolymer forms a triphasic copolymer.

31. The graft copolymer of claim 27, further comprising:

reactive functional groups.

32. The graft copolymer of claim 31, wherein the reactive functional groups are capable of stabilizing a morphology of the graft copolymer.

33. The graft copolymer of claim 32, wherein the reactive functional groups are crosslinkable functional groups.

34. The graft copolymer of claim 31, wherein the reactive functional groups are capable of crosslinking the one or more phases.

35. The graft copolymer of claim 27, wherein the relative mole fractions of the radically copolymerizable monomer units and graft (co)polymer segments effect the morphology of the graft copolymer.

36. The graft copolymer of claim 35, wherein the graft copolymer has a substantially cylindrical morphology for at least one of the phases.

37. The graft copolymer of claim 35, wherein at least two phases have a continuous morphology.